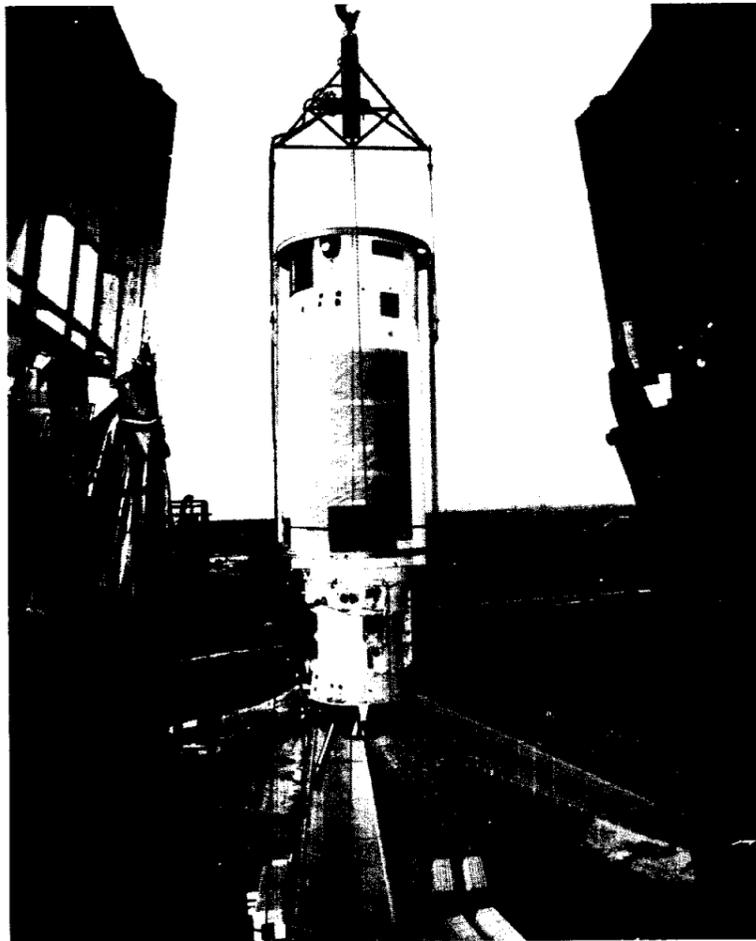


IN MEMORIAM



Administrator James E. Webb, speaking on behalf of the National Aeronautics and Space Administration, after being notified of President Kennedy's death, said, "All of us in the National Aeronautics and Space Administration are shocked and deeply grieved at the untimely death of the President. No great nation in history, faced with a time of turmoil and change, ever had a leader more capable of seeing through to the opportunities which lay ahead. We will sorrow with his family and continue to pursue his vision."



LAUNCH PREPARATIONS— Agena space vehicle used on Ranger IV Moon shot is shown high in gantry. When final mating and systems checks were made, Ranger IV was positioned on the Agena.

Lockheed Is Prime Contractor For Gemini's 'Target' Vehicle

Lockheed Missiles & Space Co. is prime contractor for the Gemini "target" vehicle with which the two-man spacecraft will rendezvous in Earth orbit.

This target vehicle, an Agena D specially modified and equipped for the Gemini mission, will be the latest and most "sophisticated" of the Agena family which

have been proven to be the nation's most reliable satellites.

Originally developed by Lockheed for the Air Force, the Agena has been used in a number of Air Force programs and has attained an outstanding record of successes in over 100 Air Force and NASA launches.

For NASA, Agenas have been the in-orbit launch vehicles for the Ranger spacecraft, one of which impacted the Moon, and for the highly successful Mariner which passed close to Venus and returned invaluable information about that planet. Other NASA programs employing the Agena include Nimbus, Echo, OAO, EOGO and POGO.

Earth at an altitude of approximately 150 miles. Twenty-four hours later, when the Agena is over the launch site, the Gemini



GLADYN H. PUTT vice president of Lockheed Missiles and Space Co. and general manager of its Space Programs Division.



L. EUGENE ROOT president of Lockheed Missiles and Space Co.

The Gemini Agena will be supplied the Manned Spacecraft Center by the Space Systems Division of the Air Force after its development at the Lockheed Missiles & Space Co. plant in Sunnyvale, Calif.

Launched by an Atlas booster from Cape Canaveral, the Gemini Agena will go into orbit of the

spacecraft will be launched by a Titan II. When the Gemini also is in orbit, then begins the intricate maneuvering by both the Gemini spacecraft and the Agena to achieve rendezvous and docking, a feat which must be perfected before man goes to the moon.

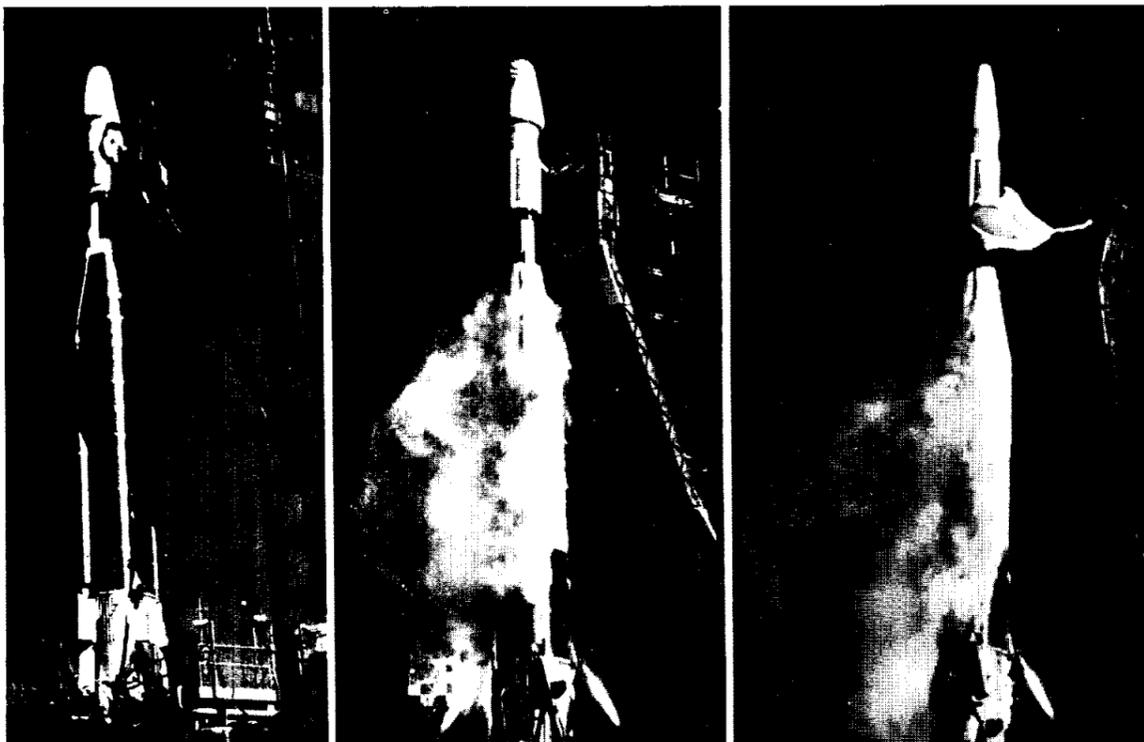
Though known as the Gemini "target" vehicle, the Agena must itself maneuver for the rendezvous. It must be a cooperative target. The Agena can be maneuvered from either the Gemini spacecraft or the Earth. Commands can also be programmed into the Agena, thus providing for "stored", timed functions.

In addition to the main engine, which provides the primary thrust, there is a secondary propulsion system developed just for the Gemini program. This secondary system provides, on command, small (or vernier) changes in velocity. After mating has been achieved, the Agena propulsion system can be restarted at will and a variety of maneuvers can be conducted with the joined vehicles.

Development of the Gemini Agena calls upon Lockheed experts in such fields as materials, mechanical systems, pyrotechnics, aerodynamics and electronics. It calls upon all the talents of the company which, with the Navy, developed the Polaris missile, and which, as stated before, produced the Agena A and the Agena B, predecessors of the Gemini Agena D.

Lockheed Missiles & Space Co., a group division of Lockheed Aircraft Corp., today has over 30,000 em-

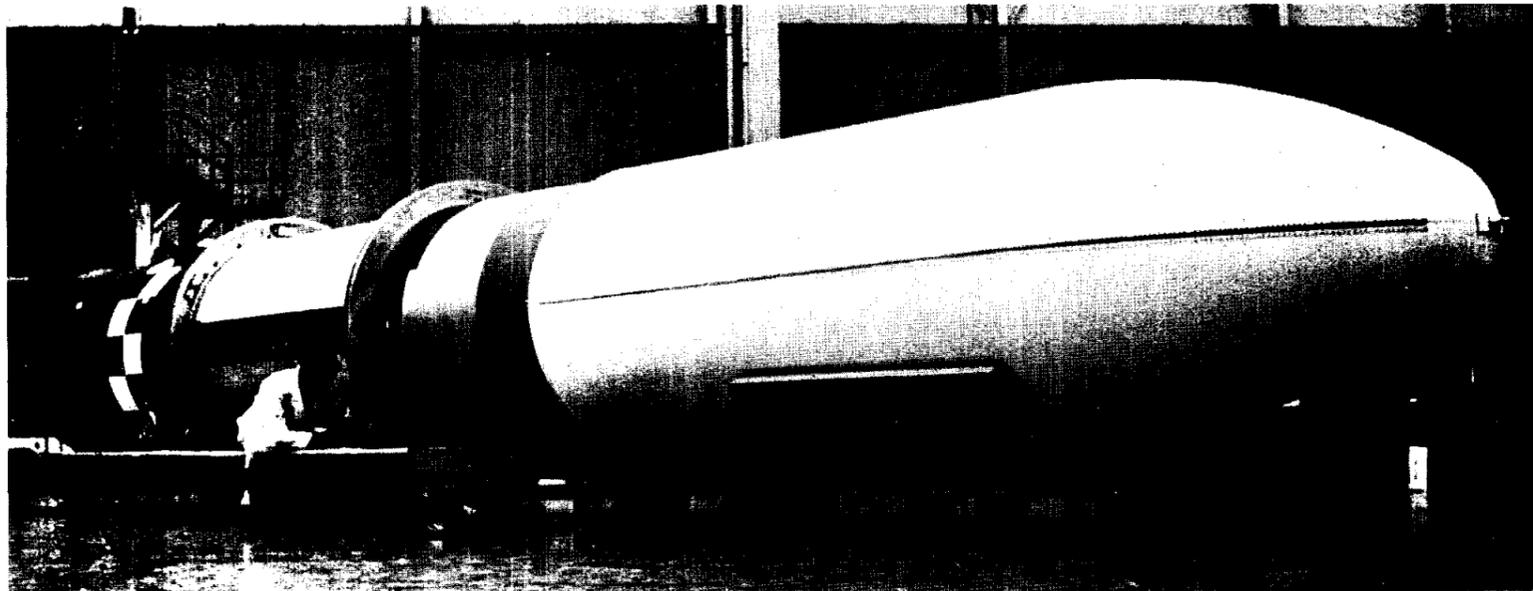
(Continued on page 3)



ATLAS-AGENA LAUNCH— An Atlas-Agena combination similar to that which will be used in the Gemini program is launched from Cape Canaveral. This is a launch sequence of Ranger IV. The NASA payload, the first U.S. spacecraft to reach the moon, was placed so accurately in a deep space trajectory by the Lockheed Agena that lunar impact was achieved without benefit of mid-course correction.



HERBERT J. BALLARD manager of the Gemini program at Lockheed Missiles and Space Co.



THE ADAPTABLE AGENA— Broad adaptability of Agena D is illustrated in this picture. Agena shown here is equipped with Thor booster adapter, and

one of a class of nose fairings designed by Lockheed Missiles & Space Co. to accommodate wide variety of orbital and space probes.



MAIN PLANT of Lockheed Missiles & Space Co., Sunnyvale, Calif., is across foreground. In the left background, back of huge dirigible hangar at Navy's Moffett Field, is NASA's Ames Research Center.

(Continued from page 2)

ployes, most of them in the San Francisco Bay area, but others located at Van Nuys, Calif.; Cape Canaveral; Vandenberg Air Force Base, Calif.; at tracking stations in Hawaii, Alaska and New Hampshire; at Huntsville, Ala., and Charleston, S.C., and at Houston, Tex. It has one of the largest research organizations in the aerospace industry. As a result of a proposal developed in the research organization, Lockheed became NASA's prime contractor for the RIFT vehicle, which

will be the nation's first nuclear powered rocket.

In addition to developing the Gemini Agena for MSC at Houston, Lockheed Missiles & Space Co. is designing and installing a Data Reduction Complex for NASA there. This computer system will process data resulting from test activities at MSC. E. K. Fisher is resident director of the program for LMSC.

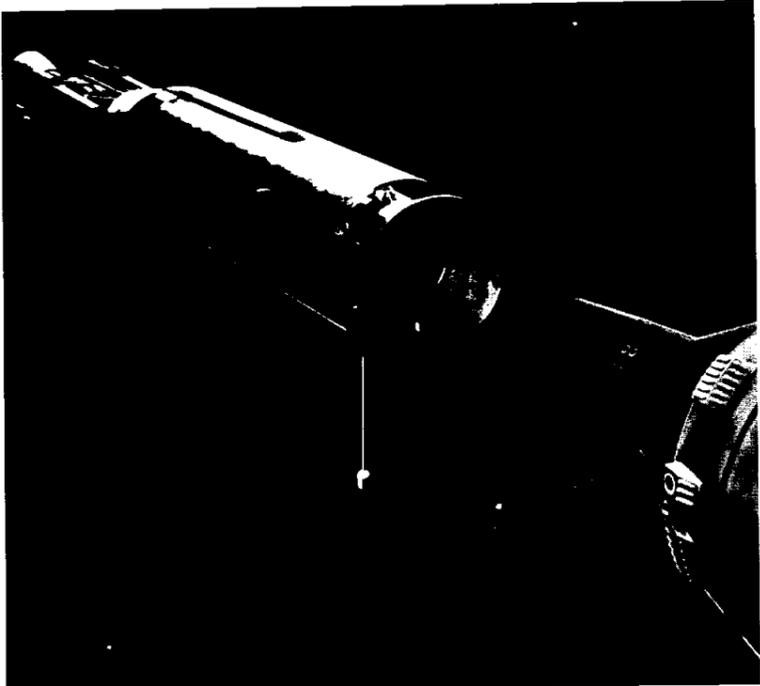
L. Eugene Root is president of Lockheed Missiles & Space Co., and Herschel J. Brown is executive vice president. Agena development and production come

within the company's Space Programs Division, of which company Vice President Gladyn H. Putt is general manager. Harold T. Luskin is assistant general manager of this division and director of Medium Space Vehicles Programs, encompassing NASA Agena projects. Luskin's assistant is Donald R. Latham.

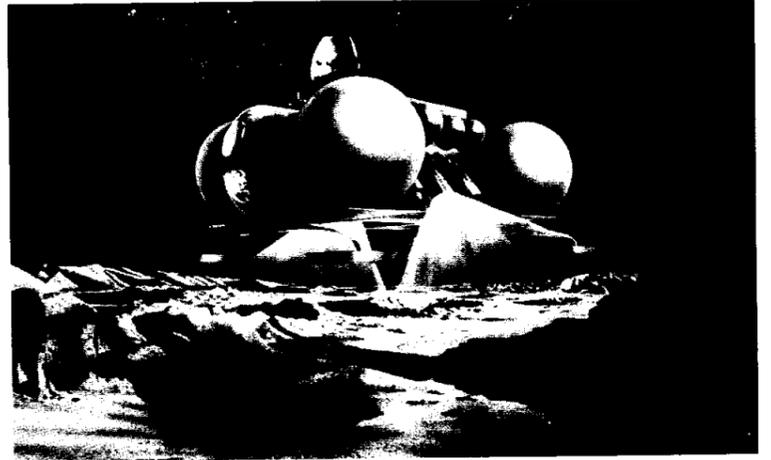
Herbert J. Ballard, a B-29 pilot during World War II, is manager of the Gemini program at LMSC. He is assisted by Avedis Aintablian, performance and operations; Harold W. Nolan, technical requirements, and Emil Malmberg, facilities and Aerospace Ground Equipment.

Specifically within Medium Space Vehicles Programs, 75 people are working full time on the Gemini program. The Gemini effort draws at one time, however, upon as many as 600 people assigned to other organizations within the company, including Research and Engineering, Manufacturing, Systems Test, the Santa Cruz Test Base, and Product Assurance.

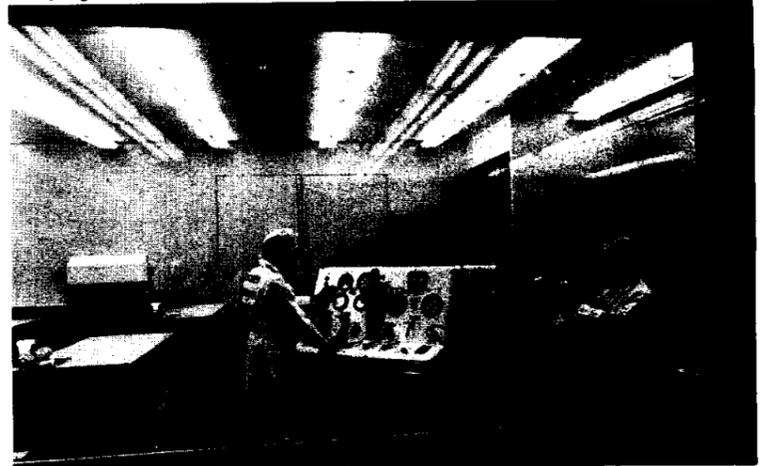
EDITOR'S NOTE: This is the seventeenth in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Public Relations Office, Lockheed Missiles and Space Company.



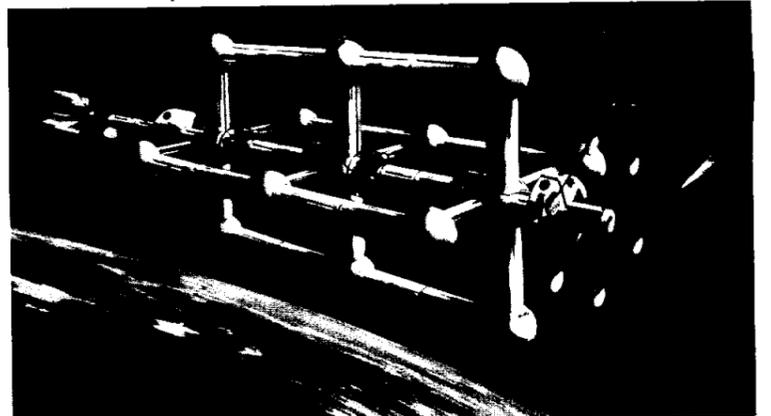
This artist's rendering of how the Air Force Agena target vehicle will mate with the two-man NASA Gemini spacecraft has been released by Lockheed Missiles & Space Co., prime contractor for the Agena. The illustration shows the nose of the Gemini spacecraft at left, as it approaches the Agena. A pin in the spacecraft nose, hidden in this view, keys into the slot in the docking adapter on the Agena. The antenna extending vertically from the Agena is for the L-band radar used in "homing" the spacecraft on the Agena, and in controlling the Agena from the spacecraft prior to docking. The Agena can be maneuvered from either the spacecraft or the earth.



MOON VEHICLE CONCEPT—A two-man vehicle, as conceived by Lockheed Missiles & Space Co. engineers, lands on the moon after leaving a spacecraft in lunar orbit. The spheres are propellant tanks. Lockheed is studying this and other space concepts.



CLEAN ROOM—A wide variety of ground equipment essential to the support of Lockheed's NASA programs is designed, developed and manufactured at LMSC's Van Nuys, Calif., facility. Here in a Van Nuys 'clean room,' Lockheed personnel check out a unit used to sterilize satellites.



SPACE STATION—Lockheed Missiles & Space Company's 216-foot "Space Station" on which a design patent was granted this year. The multi-purpose, multi-manned nuclear-powered station is projected for indefinite earth-orbit at an altitude of 318 miles where it could serve as a space laboratory, as an observation platform and as a strategic base for an almost unlimited number of missions. Controlled rotation of the station, creating a gyroscope effect, would limit pitch, roll and yaw to less than that experienced on an ocean liner riding in a calm glassy sea.

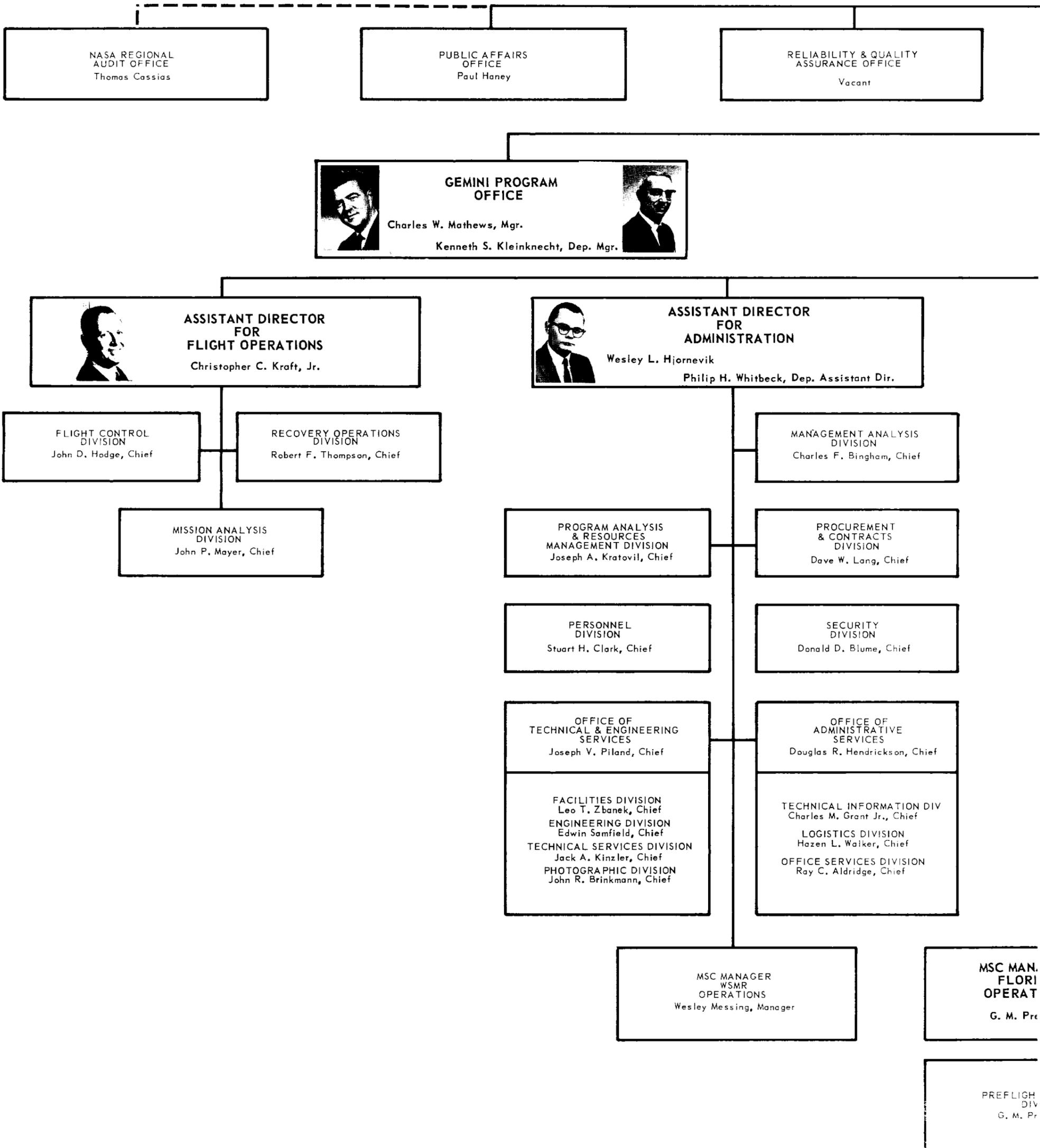


GEMINI TEAM—Members of the Gemini "team" meet at the Manned Spacecraft Center, Houston. In the center foreground, speaking, is Charles W. Mathews, Gemini project manager for MSC. Across from him is Harold T. Luskin, Lockheed director of all Agena programs involving NASA. At left is Maj. Norbert J. Walecka of the Air Force Space Systems Division, which is participating in the Gemini program. Others shown represent NASA and Lockheed.

MANNED SPACECRAFT CENTER



DIRECTOR
Dr. Robert R. Gilruth



ORGANIZATION CHART

DEPUTY DIRECTOR
James C. Elms



SPECIAL ASSISTANT
Paul E. Purser



CENTER MEDICAL OPERATIONS OFFICE
Charles A. Berry, M.D., Chief

LEGAL OFFICE
J. W. Ould, Chief Counsel

APOLLO SPACECRAFT PROGRAM OFFICE



Dr. Joseph F. Shea, Mgr.



Robert O. Piland, Dep. Mgr.

ASSISTANT DIRECTOR FOR ENGINEERING & DEVELOPMENT
Maxime A. Faget



George B. Graves, Dep. Asst. Dir.
SYSTEMS TEST & EVALUATION
Aleck C. Bond, Manager

ASSISTANT DIRECTOR FOR FLIGHT CREW OPERATIONS
Donald K. Slayton



GUIDANCE & CONTROL DIVISION
Maxime A. Faget, Acting Chief

STRUCTURES & MECHANICS DIVISION
Joseph N. Kotanchik, Chief

ASTRONAUT OFFICE
D. K. Slayton

AIRCRAFT OPERATIONS OFFICE
Joseph Algranti, Chief

CREW SYSTEMS DIVISION
Richard S. Johnston, Chief

INSTRUMENTATION & ELECTRONIC SYSTEMS DIVISION
George B. Graves, Acting Chief

FLIGHT CREW SUPPORT DIVISION
Warren J. North, Chief

ADVANCED SPACECRAFT TECHNOLOGY DIVISION
William E. Stoney, Jr., Chief

COMPUTATION & DATA REDUCTION DIVISION
Eugene H. Brock, Chief

PROPULSION & ENERGY SYSTEMS DIVISION
Aleck C. Bond, Acting Chief

MANAGER OPERATIONS
Richard S. Johnston



OPERATIONS DIVISION
Richard S. Johnston, Chief

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Robert R. Gilruth
 Public Affairs Officer Paul Haney
 Chief, News Bureau Ben Gillespie
 Editor Milton E. Reim

On The Lighter Side

Future Time Machine Possible

There is a possibility, arising from Einstein's Theory of Relativity, of a time machine being built for travel into the future.

Soviet Academician A. Landau believes, by applying the theory, a clock on a spaceship would run more slowly than a clock on Earth (see story this page). As this happens, all physical, chemical and biological processes would also slow down.

Thus, if a spaceship could be built to travel at a speed close to that of light, an astronaut, on returning from a flight would find his contemporaries advanced in years while he is still young.

Perhaps he would be greeted upon his return by the little girl next door, who, in the interval of his travels, has grown up to enhance his welcoming committee.

In other words, the astronaut would have actually made a trip into the future. For example:

A visit to the star Sirius, which is six light years away, would take 15 years by Earth calculations--if the spaceship traveled at the speed of light--186,000 miles per second.

But by the ship's clock, the astronaut would make the round trip in nine years. Thus upon his return he would be six years younger than his contemporaries. If the speed of the spacecraft were increased, it would be possible to travel further into the future.

However, chances are of such a flight anytime soon seem remote. To fly a one-ton spaceship at such a speed would require an amount of energy equivalent to several months output from all the power stations on Earth.

Reprinted courtesy Spaceport News

Study Proves Rendezvous Possible Using Only Radar And Pilots Skill

An operations team from the NASA Manned Spacecraft Center has completed a study at Ling-Temco-Vought, Inc. in Dallas to determine whether man can accomplish spacecraft rendezvous should some of his electronic devices fail and he has to rely on a combination of pilot skill and his spacecraft radar.

The verdict: he can. Findings represent an important safety factor for space programs where rendezvous is required.

In the lunar program, the Command and Service Module and the smaller Lunar Excursion Module (LEM) will be placed into lunar orbit together. The LEM with two space pilots aboard will detach from the Command Module, make the actual landing on the moon and later launch to a rendezvous with the still orbiting Command Module. Rendezvous is essential to mission success.

For Apollo, the astro-

nauts' spacecraft will have automatic guidance and navigation equipment and the pilots will receive a wealth of information from ground-based tracking and computing stations. But to assure highest probability of mission success MSC wanted to know whether man could make his rendezvous using only pilot know-how and the LEM's simple radar.

For study purposes, it was assumed that certain guidance and navigation equipment became inoperative either on the moon or during the powered descent to its surface. Simulated flight tasks performed us-

WELCOME ABOARD

Twenty-five new employees joined the Manned Spacecraft Center during the period Oct. 28 through Nov. 13. All but four were assigned here in Houston.

FINANCIAL MANAGEMENT DIVISION: Eunice V. Dennis, Shirley A. Welsh, Sarah M. Creech, and Loreta M. Bradley.

WHITE SANDS MISSILE RANGE (N. M.): Floy E. Heinlein, and Cora L. Melder.

FACILITIES DIVISION: Evelyn L. Huvar, and Mary D. Witten.

ADMINISTRATIVE OFFICE (Cape Canaveral): Clara K. Smith.

PRE FLIGHT OPERATIONS (Cape Canaveral): Jane E. Harper.

FLIGHT OPERATIONS DIVISION: Walter C. Wilson, and Richard D. Glover.

FLIGHT CREW OPERATIONS DIVISION: Dean F. Grimm.

OFFICE SERVICES DIVISION: Clarence A. Walty, and Nola S. Carroll.

SPACE ENVIRONMENT DIVISION: C. Bruce Stephenson.

SPACECRAFT TECHNOLOGY DIVISION: Louis J. Ruffino, Robert B. Bris-

Texas City Architects

Awarded Design Contract For Road, Guard Stations

Cummins and Reed, Texas City architects, were recently awarded a contract to design six guard stations and an access road at the NASA Manned Spacecraft Center's Clear Lake site.

The contract, in the amount of \$4,400, calls for plans, specifications and a cost estimate for the work. The road runs from a parking lot to the Center headquarters building and the guard stations are to be-

ing radar as the primary sensing device included ascending from the lunar surface, injecting into orbit, circularizing the orbit, adjusting orbit altitude, changing the orbital plane to agree with that of the Command Module and making midcourse guidance corrections.

Time after time astronauts who participated in these experiments were able to rendezvous with the Command Module relying on LEM radar information.

Director of the experiment was Paul C. Kramer, technical assistant to the chief of the Flight Crew Support Division at MSC.

Kramer pointed out that if man can use his own

MSC PERSONALITY

W. B. Mitchell Heads Gemini Launch Vehicle Integration

Willis B. Mitchell, former chief of aerophysics on the Atlas and Centaur programs, joined NASA in April 1962 as manager of Launch Vehicle Integration in the Manned Spacecraft Center's Gemini Program Office.

In this position his responsibilities include the Gemini launch vehicle (a modified Air Force Titan II), the Atlas-Agena D launch vehicle and the launch facilities for these vehicles at Cape Canaveral.

Mitchell was born in Tulsa, Oklahoma and completed high school there in 1938. He attended the University of Oklahoma and received a BS degree in mechanical engineering in 1942.

He saw action in the Philippines and Okinawa with the U. S. Army 1942-46 and attained the rank of captain. Following World War II,

tow, and David R. Spence. GROUND SYSTEMS PROJECT OFFICE: Donald L. McCormick.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Douglas A. LaPoint.

SYSTEMS EVALUATION AND DEVELOPMENT DIVISION: Lawrence E. Birdsong.

CREW SYSTEMS DIVISION: Leslie Alexander Geddes.

COMPUTATION AND DATA REDUCTION DIVISION: Ray J. Roten.

SECURITY DIVISION: Adell K. Spacek.

El Paso Firm Gets \$80,000 Contract For WSMR Security

The NASA Manned Spacecraft Center recently awarded a contract valued at \$80,000 to Security Guard Services, Inc., of El Paso, Tex. for security protection services at MSC's White Sands Missile Range facilities.

Contract will be in force for one year from Oct. 31, 1963 and will be executed in New Mexico.

ability to supplement automatic guidance and navigation equipment, simple and reliable back up systems can be designed. This in turn will allow greater mission flexibility and higher chances of mission success.

The program was conducted under a four-month contract between MSC and Ling-Temco's Astronautics Division.

Astronauts participating in the experiments included Scott Carpenter, Neil A. Armstrong, James A. McDivitt and Elliott M. See Jr.

Mitchell worked for a short time in 1946 with the McDonnell Aircraft Corporation in armament design. He then joined Convair as an aerodynamics engineer and was there until 1955. From 1955 to 1960 he was



WILLIS B. MITCHELL

an aerophysics group engineer on the Atlas ICBM weapons system at General Dynamics/Convair.

In 1960 he joined GD/Astronautics as chief of Aerophysics (Atlas and Centaur Program) and while in this position, he wrote several technical reports and papers relating to the Atlas weapons system and ballistic missile design.

Mitchell is a member of Phi Eta Sigma and Tau Beta Pi, Honorary engineering fraternities at the University of Oklahoma.

As a hobby he collects and does modification work on guns and enjoys target shooting. He also likes to bowl.

He is married to the former Margie Easterwood of Midlothian, Tex., and the couple reside in Houston with their two sons, Willis III 16, and Gary 14.

EGO Satellite To Test

Einstein's Time Theory

NASA will test the adapted portion of Einstein's Relativity Theory that time will actually slow down for astronauts rocketing in space at great speeds, by placing an atomic clock in the nose cone carrying the EGO (Eccentric Geophysical Observatory) satellite next year.

The unique clock will be synchronized with an earth-bound time piece and then will be electronically checked once it is in orbit to see if space travel actually does slow time down.

MSC Institutes New Method Of Procurement

Proposal Request For Vibration System Introduces Action

In a request for proposals for a vibration system, Manned Spacecraft Center has instituted new procurement methods designed to provide products of higher quality at prices more favorable to the Government.

The proposed procurement is being made under a Two-Step Formal Advertising method. In former procurement actions, MSC frequently requested industry to submit its proposals in one document covering the technical and business management aspects of the problem.

Step one of the new method calls for proposals covering technical detail only. No cost information is to be incorporated. The offeror also may submit multiple proposals presenting different solutions to the problem. Each proposal will be evaluated and the bidder notified of its acceptability.

In the second step, companies found to be technically acceptable will be invited to submit another proposal. A formal invitation for bid will go out to them. Contract award will be made to the lowest responsible bidder, MSC procurement officials said.

The space center also asked companies to include in their technical proposals information on: past experience, skills and the competence to accomplish the work; a resume of the experience of the personnel who will conduct the work; a description of work currently underway; and information on past experience and performances.

The successful contractor also will have to tell the space agency if he contemplates subcontracting any of the work; what internal priority he will assign to the job; how many people he employs and will it be necessary to use overtime.

Procurement officials say the two-step method provides all the advantages of competition while at the same time permitting them to retain the right to select the company with the best solution to the problem.

It clears areas of doubt between industry and government before the actual award of contract, they add, and it provides a degree of flexibility in contractor selection that cannot be readily achieved in the one step formal advertising method.

The proposal to be submitted called for a vibration system capable of deliver-



ROSEBUD METEORITE—Elbert A. King of the Lunar Surface Technology Branch, Space Environment Division, uses a caliper to measure the width of one of the ablation features on the leading surface of the Rosebud meteorite. The specimen is on loan from the University of Texas, Geology Department.

FOR MOON FLIGHTS

IMP Satellite To Check Space Radiation Levels

The first launch of the Interplanetary Monitoring Platform (IMP A), scheduled for not earlier than today at Cape Canaveral, will require at least a week to confirm whether the planned orbit has been achieved due to a nominal orbital period of 153 hours.

Its mission is to measure magnetic fields, cosmic rays and solar winds in interplanetary space—the region beyond the influence of the Earth's magnetic field.

This is the first of a series of seven planned IMP satellites.

The IMP A's weight of 138 pounds consists of 35 pounds of scientific equipment and it is essentially a compact satellite-borne physics laboratory.

The orbit planned for IMP A is a highly eccentric one. At apogee it will fly almost three-quarters of the distance to the Moon (173,000 miles). It will spend more than two-thirds of each orbit outside the Earth's magnetic field in interplanetary space.

One of the key objectives of the IMP series is to study charged particle radiation emanating from the Sun and sources beyond the Sun in interplanetary space over a period of relatively quiet solar activity through the more active phases, thus covering a significant

portion of the 11-year solar cycle. Information on radiation levels in interplanetary space gathered over extended periods and at many levels is of importance to NASA's Apollo manned lunar landing program. Some data on this hazard to manned flight beyond the Earth has been obtained by earlier satellites—particularly the Explorer series—and by balloon and sounding rocket flights. This information has shown that during periods of intense disturbances on the Sun, showers of solar cosmic rays (high energy protons) raise the radiation levels in interplanetary space. (Protons are the exceedingly small, charged portions of the nucleus of all atoms.)

Overall, the Interplanetary Explorer series will make scientific observations in the same general area of interplanetary space over an extended period of the solar cycle. These long-term observations may result in clearer understanding of the development and dynamics of the solar system.

ing between eight and 10,000 pounds of force. It will consist of a control console, power amplifier, table top shaker, cooling unit, auxiliary equipment as required and a spare parts kit.

The system is being built for MSC's Instrumentation and Electronics System Division.

SPECIMENS NEEDED

Knowledge About Meteorites May Aid Moon Astronauts

An astronaut landing on the moon may pick up a piece of rock and upon close examination say to his partner, "this is a carbonaceous chondrite," and his ability to do so would be the result of studies conducted by the Lunar Surface Technology Branch of the Space Environment Division, Manned Spacecraft Center.

With complete knowledge of this type rock or any other type that may exist on the surface of the moon, the astronaut will be in a position to recognize and report accurately on his findings in a minimum of time.

The Lunar Surface Technology Branch, headed by John E. Dornbach, is presently doing research on extra-terrestrial objects, in relation to the Apollo project, to learn as much as possible from meteorites in the event that some of these objects from outer space might have come from the surface of the moon.

At the present time this branch of MSC is extremely interested in acquiring new specimens for examination. Upon receipt of a meteorite sample (about one or two ounces is ample) the branch personnel will test and inform the contributor of the type meteorite and its composition.

Characteristically, meteorites are always solid, usually with an irregular shape and heavy for their size. They are black or brown on the outside, and most show metallic iron when ground on a clean carborundum surface.

Most mineralogists dream of being able to examine a

"new" meteorite within a week or ten days after it falls, to check for high energy radiation effects.

Elbert A. King, aerospace technologist, is presently studying samples taken from the 124 pound Rosebud meteorite (very fine hypersthene chondrite). The exceptionally well preserved specimen is on loan from the University of Texas, Department of Geology.

Discovered near Rosebud, Tex. in Milam County about 1907, the meteorite was used for a time as a hitching stone in front of a drug store in Rosebud.

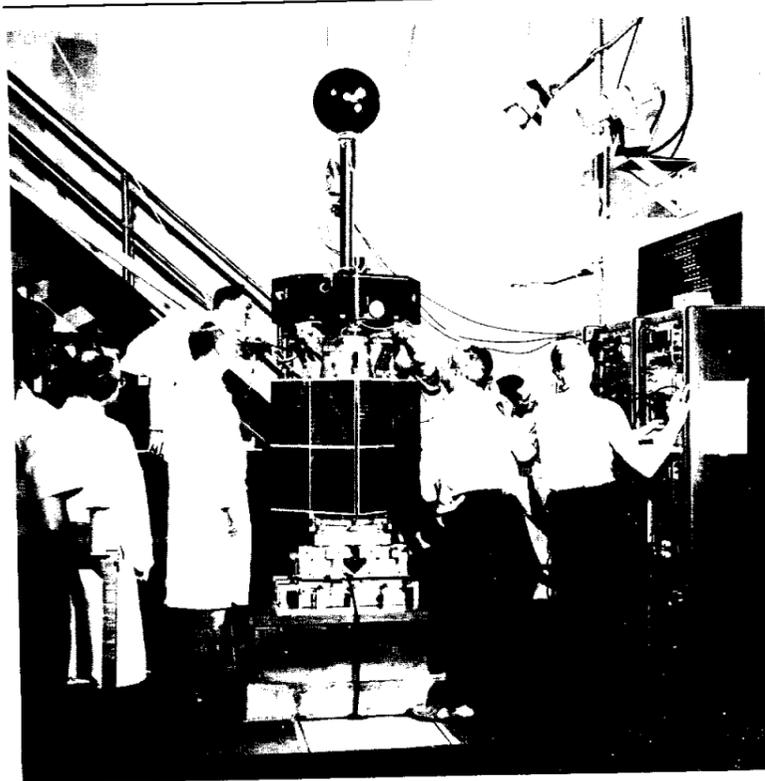
Presented to the University of Texas in 1915 by Capt. J.W. Waters, the initial description and petrographic analysis of the specimen was made by Prof. Fred. M. Bullard of the University.

New analytical techniques have been developed since that time and mineralogists like King are able to make many new discoveries heretofore unknown.

Two sample cores were taken from the Rosebud meteorite for petrographic examination. Sections of the specimen are examined through the use of X-ray diffraction and X-ray fluorescent analysis and much can be learned about the composition and possible uses for the rock in relation to the needs of man in a space environment such as the moon or other planets.

The Rosebud meteorite is unique in that it has an exceptionally well preserved ablation surface.

There are only about 1500 known meteorites in scientific collections in the entire world.



IMP SATELLITE—The IMP receives a thorough checkout prior to launching.



SECOND FRONT PAGE

Distance Measuring Beacon For Spacecraft, Up For Bid

NASA Manned Spacecraft Center has asked for bids on a new compact measuring beacon that will tell searchers exactly how far they are from a spacecraft that has returned to earth.

The request calls for a beacon that weighs ten pounds and will displace no more than 300 cubic inches of area in the spacecraft.

The beacon will have a minimum output of 300 watts power and is to be compatible with distance measuring (DM) or tactical air control and navigation (TACAN) beacons found on military search aircraft.

DM and TACAN contains equipment which permits computation of distance in miles.

Previous spacecraft beacons transmitted signals on which search craft could home, but there were no provisions for calculating distance.

The beacon is to be constructed for MSC's Flight Operations Division.

Langley Research Center's

Lunar Landing Tester A Real Swinger

A giant six-legged steel gantry that will dangle a 10-ton space vehicle on a "string" is nearing completion at NASA's Langley Research Center, and soon will begin tests aimed at landing a rocket-powered vehicle on the Moon.

The towering frame, 400 feet long and 250 feet high, will serve as a controlled development labora-

tory, even simulating the Moon's gravitational pull, above one-sixth as strong as Earth's.

Lunar gravity is achieved by slinging the space model

from a moveable crane on cables which support only five sixths of the vehicle's weight. The remaining sixth of the craft's own weight pulls it downward.

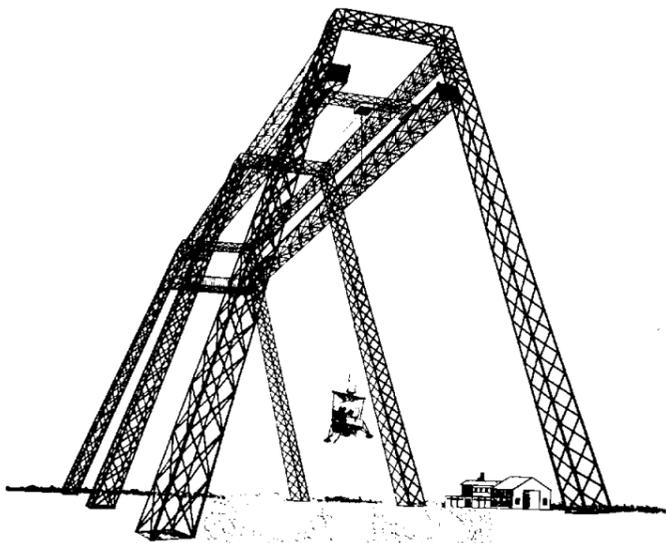
Propelled and maneuvered by its own rocket engine system, and assisted by a catapult mechanism in the gantry, the pilot-operated craft's special pivots enable it to pitch, roll and yaw freely as it would in space.

Test vehicles range between 10,000 and 20,000 pounds including their two-man crews and 3,300 pounds of hydrogen peroxide fuel.

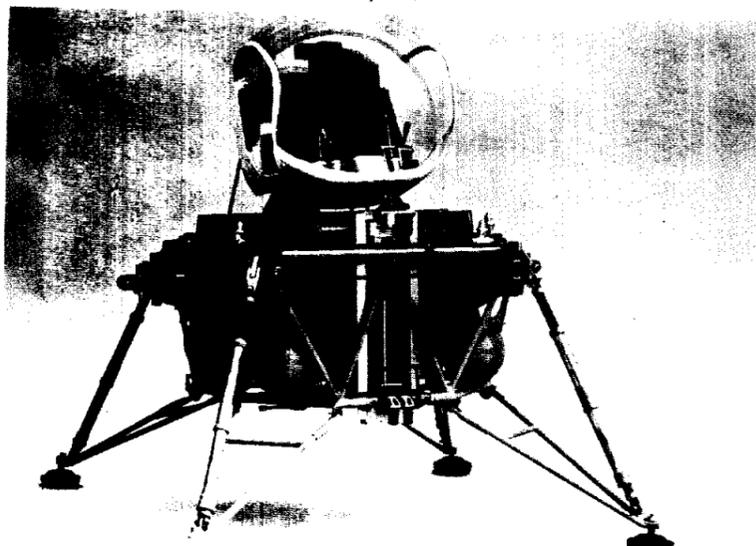
Bouncing, bobbing, and wheeling at horizontal speeds up to 50 feet per second and vertical velocities up to 40 feet per second, the craft is expected to be rough on pilots as it tests ground crash characteristics and human shock conditions.

A "flight" can be aborted automatically, or manually, by the pilots or by ground personnel in a nearby control room. The abort will stop all systems and bring the crane and its lift system to a halt before the research vehicle strikes the ground or any part of the gantry.

The Langley facility is capable of testing an actual Lunar Excursion Module. The research vehicles will be about the size of the LEM and the variations available in the models systems simulate actual stability and control systems in the LEM.



MOONSHIP ON A 'STRING'—This 250-foot high gantry, dangling a 10-ton research moonship from a crane, is approaching completion at NASA's Langley Research Center at Hampton, Va.



LUNAR RESEARCH CRAFT—This is a model of prototype rocket-powered vehicle to be used in lunar landing test facility nearing completion at NASA's Langley Research Center, Hampton, Va.

MSC Requests Proposals For CDR Division

Industry has been requested by the NASA Manned Spacecraft Center to submit proposals leading to a fixed-price call order contract for computer programming and operating services.

Four general areas of work are contemplated in this proposal. They are: preparation of a program to handle management and engineering problems; modification of existing programs; operation of equipment to produce summary reports; and preparation of data from coded information supplied by the Government.

The period of the contract is expected to run for 12 months from Nov. 30, 1963. It will be done for MSC's Computation and Data Reduction Division.



NEW CIVIL SERVICE EMPLOYEE—Donald K. Slayton, one of the original seven astronauts and former Air Force major is sworn in as a Civil Service employee by Louise Brown, of the Personnel Division, Administrative Branch. Slayton's resignation from the Air Force became effective on Nov. 20. He is now assistant director for Flight Crew Operations at MSC.

Disconnect Coupling Contract For Apollo, Awarded Romec

The Romec Facility of the Power Equipment Division of Lear Siegler, Inc., recently received a contract from the Space and Information Systems Division of North American Aviation, Inc., Downey, Calif., for test disconnect couplings.

North American's Space Division is principal contractor for the Apollo command and service modules for NASA's Manned Spacecraft Center.

The test point couplings to be supplied by the Romec Facility will be used on the Apollo command and service modules for check-out of the propellant systems prior to launch.

The \$500,000 contract calls for the Romec Facility to design, develop and qualify the one-fourth inch quick disconnect couplings to withstand the requirements of the space environment. In addition, the Romec Facility is to produce and supply cou-

plings for the initial production of the Apollo program.

Two Groups Move To Clear Lake Site, Another Scheduled

Two more moves by MSC personnel have been made recently to the Clear Lake Site and another group is scheduled to move early next week.

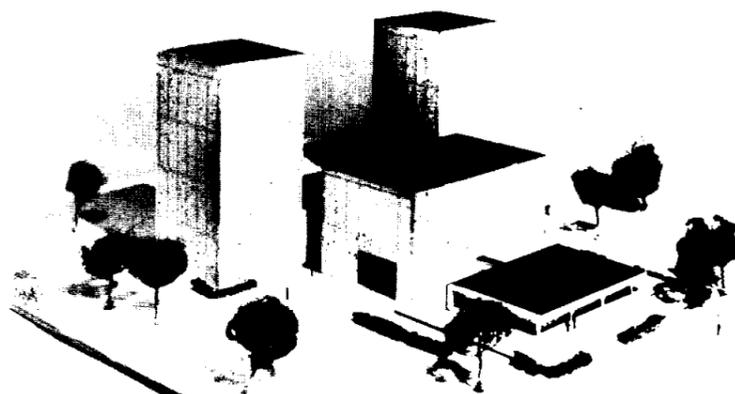
Already moved into new quarters are the Operations and Maintenance Branch of the Facilities Division and the Stores Stock Procurement Section of Procurement and Contracts Division. Both are now located in Bldg. 419 at Clear Lake, Site 1.

Scheduled to be moved into Bldg. 12 at Clear Lake, by next Tuesday is the Data Reduction Complex Project Group, Computation and Data Reduction Division.

\$1.5 Million Vibration Lab To Be Built At Clear Lake

Builders have been invited by the Corps of Engineers, Ft. Worth District, to submit proposals on the construction of a Vibration Test Laboratory complex of buildings that will have an approximate value of \$1.5 million, and be located at the Manned Spacecraft

Center. The laboratory will have approximately 13,700 square feet and will contain a general vibration test area 42 feet in height, a spacecraft vibration test area about 115 feet tall, and a second story for offices, shops and control rooms.



VIBRATION TEST LABORATORY—Shown is a model of the Vibration Test Laboratory to be constructed at MSC's Clear Lake Site.